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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/627,677	07/28/2003	Naoki Imachi	SNY-036	4594
20374	7590	11/06/2006		
KUBOVCIK & KUBOVCIK SUITE 710 900 17TH STREET NW WASHINGTON, DC 20006			EXAMINER YUAN, DAH WEI D	
			ART UNIT	PAPER NUMBER
			1745	

DATE MAILED: 11/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/627,677

Applicant(s)

IMACHI ET AL.

Examiner

Dah-Wei D. Yuan

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 September 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13, 15 and 16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13, 15 and 16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

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**LITHIUM SECONDARY BATTERY INCLUDING ANODE CONTAINING
SUBSIDIARY ACTIVE MATERIAL**

Examiner: Yuan

S.N. 10/627,677

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November 1, 2006

Detailed Action

1. The Applicant's amendment filed on September 13, 2006 was received. The title of the invention was changed. Claim 14 was cancelled. Claim 1 was amended.
2. The text of those sections of Title 35, U.S.C. code not included in this action can be found in the prior Office Action issued on June 13, 2006.

Claim Rejections - 35 USC § 102

3. The claim rejections under 35 U.S.C. 102(e) as anticipated Gao et al. (US 2002/0119373 A1) on claims 1-6,11-13,15,16 are withdrawn, because the independent claim 1 has been amended.

Claim Rejections - 35 USC § 103

4. Claims 1-6,11-13,15,16 are rejected under 35 U.S.C. 103(a) as unpatentable over Gao et al. (US 2002/0119373 A1).

With respect to claims 1,3-6, Gao et al. teach a non-aqueous lithium secondary battery, wherein the host material in the anode includes one or more materials capable of absorbing and desorbing lithium, such as carbonaceous material or $\text{Li}_4\text{Ti}_5\text{O}_{12}$ (subsidiary active material). In

addition, Gao et al. teach the use of copper foil as the anode current collector. See Abstract, Paragraphs 20,23.

The disclosure of Gao et al. differs from Applicant's claims in that Gao et al. do not specifically describe the amount of subsidiary active material in the anode. However, Gao recognizes that the amount of lithium is critical to avoid the formation of lithium carbide. See Paragraph 18. Therefore, it would have been within the skill of the ordinary artisan to adjust the amount of the subsidiary active material in the anode to yield desired electrochemical performance. *Discovery of optimum value of result effective variable in known process is ordinarily within skill of art.* In re Boesch, CCPA 1980, 617 F.2d 272, 205 USPQ215.

With respect to claim 2, Gao et al. teach the host material further comprises carbon black. See Paragraph 20. Gao et al. do not specifically disclose the subsidiary active material has an electrical potential that is higher an electrical potential at which the carbon occludes and releases lithium and is lower than an electrical potential at which copper is dissolved. However, it is the position of the examiner that such properties are inherent, given that both Gao et al. and the present application utilize the same anode active material. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature *is necessarily present in that which is described in the reference.* In re Robertson, 49 USPQ2d 1949 (1999).

With respect to claims 11,12, Gao et al. teach the adhering of lithium metal (26) onto the anode of the battery. See Paragraph 18.

With respect to claim 13, Gao et al. do not specifically disclose the range of ratio of initial negative electrode charge capacity/positive electrode capacity. However, it is the position

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of the examiner that such properties are inherent, given that both Gao et al. and the present application utilize the same anode active material and cathode active material. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature *is necessarily present in that which is described in the reference*. In re Robertson, 49 USPQ2d 1949 (1999).

With respect to claims 15,16, Gao et al. teach the use of LiCoO_2 as the cathode active material. See Paragraph 16.

5. Claims 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gao et al. (US 2002/0119373 A1) in view of Singhal et al. (US 6,827,921 B1).

Gao et al. disclose a non-aqueous electrolyte battery as described in Paragraph 4 above. However, Gao et al. do not specifically disclose the particle size of the $\text{Li}_4\text{Ti}_5\text{O}_{12}$ material. Singhal et al. teach the use of ultra fine powder of $\text{Li}_4\text{Ti}_5\text{O}_{12}$ with particles in the size range of 25-500 nm in the anode in order to improve the electrochemical performance of the battery. See Abstract, Column 1, Lines 11-19. Therefore, it would have been obvious to one of ordinary skill in the art to incorporate the $\text{Li}_4\text{Ti}_5\text{O}_{12}$ powder that is less than 5 μm in size in the battery of Gao et al., because a Singhal et al. teach the use of fine anode powder to improve the electrochemical performance of the battery.

6. Claims 1-6,13,15,16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koshiba et al. (US 5,545,468) in view of Gao et al. (US 2002/0119373 A1).

With respect to claims 1,3-6, Koshiba et al. teach a non-aqueous lithium secondary battery, wherein the anode includes $\text{Li}_x\text{Ti}_y\text{O}_4$ (subsidiary active material) wherein $0.8 \leq x \leq 1.4$ and $1.6 \leq Y \leq 2.2$. See Column 4, Lines 21-67. However, Koshiba et al. do not disclose the use of copper as the current collector. Gao et al. teach a non-aqueous lithium secondary battery, wherein the anode current collector is made of copper foil to transmit electrons to an external circuit. See Paragraph 23. Therefore, it would have been obvious to one of ordinary skill in the art to use copper as the anode current collector in the battery of Koshiba, because Gao teach the use of copper current collector to transmit electron to an external circuit.

The disclosure of Koshiba and Gao et al. differs from Applicant's claims in that Koshiba and Gao et al. do not specifically describe the amount of subsidiary active material in the anode. However, it is well known in the battery art that the charge/discharge capacity of the battery is determined by the amount and composition of the anode active material, including subsidiary active material, in the battery. Therefore, it would have been within the skill of the ordinary artisan to adjust the amount of the subsidiary active material in the anode to yield desired electrochemical performance. *Discovery of optimum value of result effective variable in known process is ordinarily within skill of art. In re Boesch*, CCPA 1980, 617 F.2d 272, 205 USPQ215.

With respect to claim 2, Koshiba et al. teach the host material further comprises carbon black. See Column 7, Lines 39-49. Koshiba et al. do not specifically disclose the subsidiary active material has an electrical potential that is higher an electrical potential at which the carbon occludes and releases lithium and is lower than an electrical potential at which copper is dissolved. However, it is the position of the examiner that such properties are inherent, given

that both Koshiba et al. and the present application utilize the same anode active material. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature *is necessarily present in that which is described in the reference*. In re Robertson, 49 USPQ2d 1949 (1999).

With respect to claim 13, Gao et al. do not specifically disclose the range of ratio of initial negative electrode charge capacity/positive electrode capacity. However, it is the position of the examiner that such properties are inherent, given that both Koshiba et al. and the present application utilize the same anode active material and cathode active material. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature *is necessarily present in that which is described in the reference*. In re Robertson, 49 USPQ2d 1949 (1999).

With respect to claims 15,16, Koshiba et al. teach the use of LiCoO_2 as the cathode active material. See Column 3, Lines 35-47.

7. Claims 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koshiba et al. (US 5,545,468) and Gao et al. (US 2002/0119373 A1) as applied to claims 1-6,13,15,16 above, and further in view of Singhal et al. (US 6,827,921 B1).

Koshiba and Gao et al. disclose a non-aqueous electrolyte battery as described in Paragraph 6 above. However, Koshiba and Gao et al. do not specifically disclose the particle size of the $\text{Li}_4\text{Ti}_5\text{O}_{12}$ material. Singhal et al. teach the use of ultra fine powder of $\text{Li}_4\text{Ti}_5\text{O}_{12}$ with particles in the size range of 25-500 nm in the anode in order to improve the electrochemical

performance of the battery. See Abstract, Column 1, Lines 11-19. Therefore, it would have been obvious to one of ordinary skill in the art to incorporate the $\text{Li}_4\text{Ti}_5\text{O}_{12}$ powder that is less than 5 μm in size in the battery of Koshiba and Gao et al., because a Singhal et al. teach the use of fine anode powder to improve the electrochemical performance of the battery.

Response to Arguments

9. Applicant's arguments filed on September 13, 2006 have been fully considered but they are not persuasive.

Applicant's principle arguments are

(a) Gao does not disclose the inclusion in the anode of its battery of a material for supplying lithium from the negative electrode to the positive electrode at a condition of overdischarge in an amount sufficient to saturate lithium occluding at the positive electrode to reduce an electrical potential of the positive electrode and terminate discharge of the battery before a electrical potential of the negative electrode reaches the electrical potential at which copper is dissolved from the current collector;

(b) Carbon black is not a primary active material and is not capable of occluding and releasing lithium in the Koshiba reference.

In response to Applicant's arguments, please consider the following comments.

(a) Mere recognition of latent properties in the prior art does not render nonobvious an otherwise known invention. "The fact that appellant has recognized another advantage which

would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious.” *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). Also, it is noted that the Applicant has yet to provide any factual evidence in support of the criticality of the content of the subsidiary active material in the anode;

(b) The carbon black is known to be able to occlude and release lithium ions in the battery art as evidenced by Totsuka et al. (US 2005/0208383 A1) (see paragraph 45) and Sato (US 2004/0094741 A1) (see paragraph 228). The phrase “subsidiary” in claim 1 is interpreted as “furnishing aid or support”. The lithium titanates along with carbon black material are used together as the anode active electrode material in the battery disclose by Koshiha.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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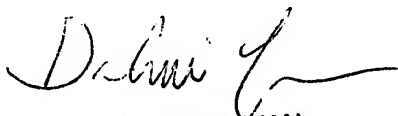
however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dah-Wei D. Yuan whose telephone number is (571) 272-1295. The examiner can normally be reached on Monday-Friday (8:00-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan, can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Dah-Wei D. Yuan
November 2, 2006



DAH-WEI YUAN
PRIMARY EXAMINER